

## UNITED STATES PATENT OFFICE

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## VAPORIZER FOR COMBUSTION ENGINES

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This invention relates to fuel vaporizing devices for combustion engines and more particularly is concerned with improvements in devices of the kind wherein provision is made for utilizing the exhaust gases of the engines as a heating medium to aid in the vaporization of the fuel.

One object of the invention is to provide a device which will condition the fuel in such a manner that its potential energy may be fully utilized, thereby insuring better engine performance and a saving in fuel consumption and preventing the formation of carbon in the cylinders of the engine and the production of carbon monoxide and other objectionable gases.

A further object is to provide a device which is so designed that the fuel is delivered to the cylinders of the engine in a highly vaporized, dry and expanded state, this object contemplating a device which is available as a muffler and in which the vaporization and expansion of the liquid components are effected at sub-atmospheric pressures and prior to their mixture with the air component.

A still further object is to provide a device which will condition the components of the fuel in such a manner that they may be uniformly and intimately mixed without the use of a carburetor.

A still further object is to provide a device which will enable the use of various inferior and inexpensive grades of fuel.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation of the device as applied to the engine of a motor vehicle;

Figure 2 is an enlarged view of the device, partially in elevation and partially in section;

Figure 3 is a section taken along line 3—3 of Figure 2;

Figure 4 is a section taken along line 4—4 of Figure 3;

Figure 5 is a fragmentary section taken along line 5—5 of Figure 3; and

Figure 6 is a section taken along line 6—6 of Figure 4.

The device, as illustrated, includes similar casings 8 and 9 which are secured together as a unit and which are formed to provide vaporizing chambers 10 and 11, respectively, it being understood that the number of casings may be varied.

Two series of ribs 12 are formed in each of the vaporizing chambers, the ribs of each series being spaced from one another to provide branch passages 13 and being spaced from the ribs of the adjacent series to provide main passages 14 with which the said branch passages communicate.

The vaporizing chambers are closed by cover plates 15. The latter carry baffles 16 which are supported in the spaces between the ribs 12, the said baffles extending across the main passages 14 and into, but short of the ends of, the branch passages 13 to provide tortuous paths. The outlet 10a of the chamber 10 is connected by a conduit 17 with the inlet 11a of the chamber 11, the outlet 18 of the latter chamber being connected by a conduit 19 with a mixing chamber 20 which is located at the lower end of a pipe 21. The said pipe is connected to an extension 22 of the intake manifold 22a of the engine. A valve 23 is arranged in the said extension and is connected by a lever 23a (Figure 1) and rod 23b to a conventional throttle (not shown).

The gasoline or other fuel is introduced into the vaporizing chamber 10 through a nozzle 24. The latter is connected by a pipe 25 with a reservoir 26 in which a predetermined amount of the fuel is maintained by a float controlled valve 27, the fuel being supplied to the reservoir through a pipe 28.

In accordance with the invention the ribs 12 are hollow, each being formed to provide a cell 29. The cells in one series of ribs open at one side into an inlet chamber 30 while the cells of the companion series open at one side into an outlet chamber 31, the cells of both series of ribs opening at their backs into a connecting chamber 32 which is located behind the ribs and which is closed by a cover plate 33. The casings 8 and 9 are arranged end-to-end so that the outlet chamber of the latter communicates with the inlet chamber of the former, the gases from the exhaust manifold 34 being introduced into the inlet chamber of the casing 9 through an extension 34a. The exhaust gases, therefore, enter the series of cells at the right side of the said casing. They pass through the said cells into the connecting chamber at the rear and then enter the cells in the companion series of cells at the left side of the casing. The gases then enter the inlet chamber of the casing 8. They pass successively through the two series of cells in the said casing and enter an exhaust pipe 35 as they leave the outlet chamber 31, the path traversed by the exhaust gases being clearly indicated by the arrows in Figure 6. As the said gases pass through the casings 8 and 9 in the manner described their speed is reduced to such a degree that a muffler or other silencing device is rendered unnecessary.

It will be apparent that when the engine is operating at a normal temperature the gasoline or other fuel introduced into the chamber 10 will